

3. The dug channel of the Intracoastal Waterway is cut into the organic-rich muds of the estuarine basin and subdivides it into the western and eastern platforms.

This is the terminology that is utilized in the following discussion and represented on the geologic cross-sections.

#### Sediment Composition and Facies

The composition of the sediments in the North Landing River are summarized in Table 1. The major sediment component within this estuarine basin is an organic-rich, sandy mud. However, there are many different sediment facies with a significant variability in sediment composition. This variability is largely dependent upon the specific sample location and processes that are operating upon the sediments.

The sketch at the bottom of Table 1 is a schematic cross-sectional representation that displays general variations in facies and sand/clay ratios across a schematic west to east profile of the North Landing River. Figures 6, 7, and 8 (Profiles P1, P8, and P6, respectively on Fig. 4) are geologic cross-sections along three profiles based upon the sediment cores and associated analytical data. The following discussion is based upon the data in these Figures and Table 1.

The main, nondredged sediment that comprises the subbottom in the North Landing River is organic-rich (9%), sandy (17%), mud (74%) with sand/clay ratios ranging from 0.0 to 0.8 (Table 1). When this natural or in situ sediment on the estuarine floor is exposed to biological activity in combination with erosional processes of waves and tidal currents, mud is systematically winnowed from the sediment and increasing the relative concentration of sand. In addition, on the eastern platform some surface sand is also derived from the erosion of Pleistocene sediment bank shorelines. Consequently, surface sediments on the exposed eastern platform estuarine floor are very muddy (40%) sands (54%) with sand/clay ratios that are significantly over 1 and range up to 3.6 (Table 1).

Shallow cores demonstrate that the surface sediments are not uniform muddy sands, but rather consist of interlaminated sand and mud sediments. This is the situation on both the shallow eastern and western platforms adjacent to the Intracoastal Waterway where surface sand/clay ratios are considerably higher than the subsurface sediments from which they were derived (Table 1). This interlaminated sediment grades with depth to a uniform, firm mud with decreasing sand/clay ratios that range between 0.0 and 0.8 and are similar to the material that the channel is dredged into (Figs. 6, 7, and 8).

Figure 5 presents the geologic description of a 6 meter vibracore through a pile of dredged material (see location on Figs. 4 and 8) and into undisturbed underlying sediments. This core depicts 0.94 meters of interlaminated sand and mud in sharp contact with 4.07 meters of firm, slightly sandy, organic-rich mud. The interlaminated sediment is from a bathymetric mound that rises 0.94 meters above the adjacent estuarine surface. About 10 cm of new 1991 dredged material had been deposited on top of this old